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DEPARTMENT OF TRANSPORTATION

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GREGORY J. ROSINE, DIRECTOR

October 15, 2001

The Honorable Philip E. Hoffman, Chair  
Senate Appropriation Subcommittee  
on Transportation  
Michigan State Senate  
P.O. Box 30036  
Lansing, MI 48909-7536

The Honorable Scott Shackleton, Chair  
House Appropriations Subcommittee  
on Transportation  
Michigan House of Representatives  
P.O. Box 30014  
Lansing, MI 48909-7514

Dear Senator Hoffman and Representative Shackleton:

Public Act 271 of 2000, Sec. 601 states:

The legislature encourages the department to work with the road construction industry to develop performance and road construction warranties for construction contracts. The development of warranties shall include warranties on materials, workmanship, performance criteria, and design/build projects. The department will report by September 30, 2001, to the house of representatives and senate appropriations subcommittees on transportation and to the house and senate fiscal agencies on the status of efforts to develop performance and road construction warranties.

The development and implementation of warranties for highway construction is a key "strategic quality initiative" in the Michigan Department of Transportation's efforts to improve the quality of road and bridge construction. The status of warranties for highway construction contracts to date is summarized in the following discussion, along with the department's strategy for expanding the use.

The department began the active development and implementation of warranties for contract paving projects in 1997 in response to Public Act 79 of 1997, amending 1951 PA 51, Section 11(2) (MCL 247.661[2]) as follows:

*Of the amounts appropriated for state trunk line projects, the department shall, where possible, secure warranties of not less than 5-year full replacement guarantee for contracted construction work.*

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From the start the department's efforts to develop meaningful, fair warranty provisions have been through partnering with the various road construction industry organizations (Michigan Asphalt Paving Association [MAPA], Michigan Concrete Paving Association [MCPA], Michigan Paving Association [MPA], Michigan Roadway Preservation Association [MRPA], Association of Underground Contractors, Michigan Road Builders Association, and Michigan Aggregate Association). These partnering meetings have resulted in warranty provisions that are fair, understood by all parties and have been successfully implemented. It's on the basis of this cooperative effort that the department plans to continue to build further warranty concepts and applications.

Many other state DOTs are similarly developing warranties for pavement construction contracts. In particular, Wisconsin is reporting a measurable improvement in quality and performance on pilot projects involving hot mix asphalt (HMA) pavements, which include a performance warranty. The Colorado DOT has recently awarded a concrete overlay project to Interstate Highway Construction, Inc., which includes a ten year performance warranty.

### **WARRANTY TYPES**

Two types of warranties are under development as defined in the following:

**Materials and Workmanship Warranty** - *The contractor is responsible for correcting defects in the pavement caused by elements within the contractor's control (i.e., the materials supplied and the workmanship), during the warranty period. Since the owner is responsible for the pavement design, the contractor assumes no responsibility for defects that are design related. If thresholds on the performance parameters are exceeded during the warranty period, for reasons relating to the materials supplied or workmanship, the contractor is required to bring the warranted work back into compliance with the warranty requirements, at no cost to the department.*

**Performance Warranty** - *A warranty that the specified performance parameters will not exceed the specified thresholds during the warranty period. If the thresholds are exceeded during the warranty period, corrective action will be completed by the contractor to bring the warranted work back into compliance with the warranty requirements, at no cost to the owner. (Note that in this type of warranty, there are no exclusions for design related performance problems.)*

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## **PROGRESS TO DATE**

The two types of warranties defined are in various stages of development and implementation. The following brief summary will explain where they are currently being applied.

### **Materials and Workmanship Warranty**

This is the only warranty type that has been applied to date in the department's new construction, reconstruction and rehabilitation pavement program. The department provides all the traditional design details and materials specifications through the contract documents. The contractor supplies materials and constructs the pavement in compliance with the contract requirements. The contractor is responsible for the project quality control while the department assumes quality assurance and acceptance testing roles. To date, nearly 90 contracts have been successfully completed with this type of warranty. The industry associations have endorsed the materials and workmanship warranty concept, which holds the contractor responsible for only those things that are under their direct control. Historically, the materials and workmanship areas are where the contractor's expertise exists, and they are willing to warranty performance of the pavement relating to these items. This warranty was developed jointly by partnering with the paving associations (MAPA, MCPA, and MPA).

### **Performance Warranty**

The development and implementation of performance warranty specifications has been unique to the Capital Preventive Maintenance (CPM) Program. This is a relatively new program that has developed since 1997 and is now funded at \$60 million per year. The goal of the CPM program is to prolong the life of pavements in good or fair condition by preventive maintenance measures that inhibit further deterioration of the pavement. The types of fixes and materials used, e.g. chip seals and microsurfacing, are unique and sometimes proprietary to the industry. MRPA has from the beginning promoted their products and fixes under the performance warranty concept. As such, the contractor on a CPM project has control over the design of the maintenance method, the materials used and the workmanship. In essence, we do not tell them how to perform preventive maintenance work, and in turn they warranty the total performance of the product (provided the condition of the pavement is appropriate for the CPM treatment). To date, over 300 CPM projects have been constructed under this performance warranty concept.

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The department is currently working with MAPA, MCPA and MPA to develop a performance warranty to be included in the Grand Rapids M-6 freeway construction (approximately 11 miles). This project will also be let under the alternate bid contract concept. Alternate bid contracting presents the bidders with two equivalent designs, one for concrete and one for HMA, allowing them to bid on one option only. Certain flexibility will be given to the contractor in the pavement details, such as mixture design, joint spacing, etc., which will allow modification of the contract details within limited parameters. Under this performance warranty concept, the contractor becomes responsible for the pavement performance during the warranty period, regardless of the cause of any developing distress (i.e. materials, workmanship or design). The contractor is responsible for the project quality control and quality assurance. The level of department quality assurance and testing is reduced under a performance warranty. The enforcement of the warranty provisions becomes the primary factor in assuring the project is built in substantial compliance with the contract requirements.

### **FUTURE DEVELOPMENT PLANS**

The department is currently working with bridge contractors from MRBA and AUC to develop "Materials and Workmanship Warranties" for some aspects of bridge rehabilitation. Namely, a warranty to cover the materials and workmanship on bridge deck overlays, modular expansion joint replacement and the field repair and coating of shop-coated steel structures. These specifications will be used on projects in 2002 for the three areas mentioned.

We also plan to include materials and workmanship warranties for jointed reinforced concrete pavements (JRCP) and all concrete overlays beginning with the 2002 construction program. So far the only concrete pavement warranty in use is on plain jointed concrete pavement (PJCP).

### **IMPLEMENTATION STRATEGY**

To date the materials and workmanship warranty has been included only in paving contracts involving high-traffic, urban or rural trunkline routes. This includes all new concrete pavements designed as PJCP and all HMA projects involving high commercial traffic mixtures (i.e. E10, E30, E50 Superpave Mixtures). These high traffic roadways were initially the primary focus of our warranty efforts. They represent the highest investment cost and impact the highest number of users whenever work is done. We now plan to

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expand the use of materials and workmanship warranties on HMA paving projects on low volume roadways, and all JRCP and concrete overlay projects.

It has been our experience, as well as that of other states, that a warranty provision motivates contractors to “produce their best product” and avoids premature repairs or remedial work on the pavements. The effectiveness of the warranties in improving quality and extending pavement life will be assessed by comparing the performance of warranty work to non-warranty work through the department’s Pavement Management System (PMS). The biannual PMS field surveys will provide comparisons in performance for the measures of ride quality, rutting and other pavement distress types. To date, it appears that warranties do have a beneficial effect on quality with no measurable cost increase.

The use of materials and workmanship warranties is also an integral part of the department’s strategy to improve the quality of materials in HMA and concrete pavements. When a contractor assumes responsibility for assuring the long range performance of a pavement, they will select the best available materials, at very little additional cost to the project. Material improvements are anticipated under a warranty scenario, such as the voluntary use of polymers to enhance HMA pavement performance or premium aggregates.

The development of materials and workmanship warranties for bridge rehabilitation and reconstruction is in the early phase. We will evaluate the effects on quality, price, competition and performance before judging the merits of the application. Our use of a warranty on bridge field painting has been in use since 1980 and has proven to be very effective, at negligible additional cost.

The performance warranty concept will be used in the future on select reconstruction and rehabilitation projects, alternate bid contracts, industry designed demonstration projects, and the CPM Program. This type of warranty is appropriate when the contractor has substantial control over all aspects of the contract work. The performance thresholds for the 2002 program alternate bid and demonstration contracts will be established based on the observed performance of the department’s best pavements, thus raising the quality expectations.

Under the current materials and workmanship warranty provisions, the warranty thresholds for the performance measures are based on a statistical representation of the

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overall performance of all state trunkline pavements. In future development of performance warranties, we plan to “raise the bar” on these performance thresholds, which will result in better performing pavements. It is our goal to consistently construct pavements that exceed the minimum design life. This level of performance is possible to achieve, as observed on several existing trunkline projects.

### **REGION WARRANTY ADMINISTRATION**

The following explains our plan for tracking and evaluating warranted work at the region level. As we gain more experience, additional evaluation measures will be implemented. The department has formed a task group to develop a warranty administration process and statewide database. This will facilitate the identification and tracking of all warranty projects on a uniform basis throughout the state.

The monitoring of warranty performance and appropriate follow up action will be handled at the Transportation Service Center (TSC) level. Each region has been developing a monitoring process over the last two years and the goal now is to bring uniformity to the administration and enforcement of warranties. It is of particular importance that the warranty performance factors for pavements and bridges are evaluated uniformly throughout the state.

Performance measures on pavements will be quantified by the department’s PMS in terms of distress points, which reflect distress in terms of cracking, faulting, etc. Additionally, ride quality and rutting are now measured by the automated PMS surveys. The TSCs may also do a periodic visual inspection of the warranted work. These inspections will document the presence or absence of distress as described by the warranty performance measures. All inspection results will be made available to the contractor(s) involved in the warranty upon request.

The results of this region warranty tracking will give the department a continual evaluation on the effectiveness of the warranty programs. To date, warranties have had no measurable impact on project cost. The department’s construction oversight cost on warranty projects is somewhat less than on non-warranty projects. The true payoff will be if warranty projects exhibit improved performance and longer service life, as compared to non-warranty projects. Some states (e.g. Wisconsin) are reporting that this trend is being observed. This will ultimately validate the use of warranty provisions, and will lead to lower life-cycle costs for pavement construction and rehabilitation options.

## **INDUSTRY ISSUES**

The industry associations have raised concerns over several issues relating to construction warranties. The department is working to resolve these issues, as summarized below:

### **1. Bonding Issues -**

- A. Several issues have been discussed concerning the requirement for a warranty bond during the warranty period. The department is currently exploring options for modifying state law, which would allow the department to reduce both the amount and duration of the required warranty bond. We believe we can maintain adequate protection against default and also provide relief to the contractors on warranties that would extend beyond five years.
- B. The amount of the required warranty bond presently varies from 25 percent of the warrantied items (materials and workmanship warranties) to 100 percent of the contract (CPM performance warranties). The warranty bond amount must be adequate to cover any anticipated risk by the department, which is typically less than the full value of the contract. The department is willing to adjust bonding amounts to a rational level, based on experience gained through administration of our ongoing pavement warranties. The department is also willing to consider limiting the contractor's total warranty liability to a similar level. This may help the issues developing in the financial assessment of contractors by banks and bonding agencies on how to account for warranties that are in effect.
- C. The department is willing to consider the option of the warranty contract, and subsequent warranty bonds, being exclusively between department and the contractor or subcontractor responsible for the warrantied work. Draft language is being developed that may be approved for future contracts.
- D. The surety industry has expressed concern over the inability of all contractors to acquire warranty bonds over an extended period. This does not appear to be a problem to date with the existing warranty periods of three to five years. The Grand Region's M-6 performance warranty, alternate bid project will include a seven year warranty period. However, this is a large project and the contractors capable of bidding should have no problem acquiring the bonding. We plan to

maintain an open dialog with the bonding industry to resolve any issues they may have with extended warranties.

2. Changing Conditions During the Warranty Period -

The department is aware that during an extended warranty period, traffic levels on the pavement (or bridge) may change significantly. The existing warranty specifications do contain "caveat clauses" to cover these future, unknown situations. Additionally, on large projects with a performance warranty period exceeding five years, we plan to install weigh-in-motion equipment in the roadway to document the Equivalent Single Axle Loads (ESALs) actually occurring. The ESALs are the basis for the pavement design and are the direct measure of field conditions versus design assumptions. An ESAL is a single axle load of 18,000 lbs. and all projected commercial traffic to occur on a roadway over its design life is reduced to a number of ESALs (typically expressed in millions). We will likely include a provision that if an equivalent percent (comparing the warranty period to the total design life) of the design ESAL number is exceeded during the warranty period, the warranty expires. This is similar to the "3 year or 36,000 miles" warranty commonly used by automobile manufacturers.

To facilitate tracking of pavement performance, the department will make available on request the findings of all pavement condition surveys, traffic information, and distress evaluations to the contractor holding the warranty. These periodic reports will be made available through the TSCs.

3. Length of Warranty -

The department's rationale for establishing the length of a warranty period is based on a reasonable percentage of the total design life of the constructed element. We believe that 25-50 percent of the design life should be adequate to reflect the quality of the product for its entire design life. At present, the length of the materials and workmanship warranty is five years, which is typically 25-30 percent of the design life. The performance warranty on the alternate bid project is being developed initially for a seven year period. Our goal is to reach a ten year warranty period or 50 percent of the design life. To achieve this, we are considering inclusion of an "A-C Contracting" concept. For each year beyond the mandatory seven year period that the contractor is willing to extend the warranty, a "percent of bid" credit is applied that will reduce



their overall bid amount for award purposes. This concept would allow contractors to voluntarily prolong the warranty period.

4. Knowledge of Existing Conditions on Warranty Projects -

The department has extensive information on the condition and performance of pavements and bridges in the pavement management and bridge management systems. Upon request, we can make this information available to contractors who are interested in bidding warranty projects (with extended warranty periods) to assess their risks. All other project information, including existing as-built plans, soil borings, traffic data, etc., will also be obtainable upon request for evaluation, when available.

5. "Waterfall Failure" on Warranty Projects -

Industry has expressed some concern that under a performance warranty scenario a contractor may design and construct a pavement that will meet the warranty performance requirements for the duration of the warranty period, and then fail rapidly after the warranty expires. The department has extensive knowledge with pavement design and predicting pavement service life, backed by actual performance data in the pavement management system. We will build adequate safeguards into performance warranty specifications to preclude this (unlikely) possibility. All pavement designs will need to be in compliance with both AASHTO and department standards.

6. Partnering With Industry -

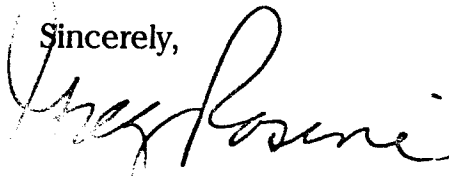
From the start, the department has partnered with industry in the development of warranty concepts and specifications. We do not always agree on the issues, but have always been willing to listen and understand the industries' issues and concerns. To the extent possible we will continue to strive to accommodate the concerns, but still move ahead in the development and implementation of warranties. We invite industry to continue this dialog with us in further development,

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as explained in this document. Copies of the existing warranty specifications have been sent to all industry associations; for additional copies or information, contact Jim Culp at 517-322-1085.

If you have any questions, please call me or Gary Taylor at (517) 373-1884.

Sincerely,

A handwritten signature in black ink, appearing to read "Gregory J. Rosine". The signature is fluid and cursive, with a large initial "G" and "R".

Gregory J. Rosine  
Director

BFA:FOD:EAT:kv  
cc Gary S. Olson, Director  
Senate Fiscal Agency  
Mitchell Bean, Director  
House Fiscal Agency